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SPECIFICATION FOR TRIAL SPECTACLE LENS SETS
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BUREAU OF INDIAN STANDARDS
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Indian Standard

SPECIFICATION FOR TRIAL SPECTACLE LENS SETS

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Indian Standard

SPECIFICATION FOR TRIAL SPECTACLE LENS SETS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 17 January 1972, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Lens trial sets are used during retinoscopy and are intended to determine the extent of ametropia and visual defects and to select corrective ophthalmic lenses as well.

0.3 A trial set consists of a trial frame, a selection of spherical and cylindrical lenses, a selection of ophthalmic prisms and a selection of accessories, contained in a case.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies the features of eye testing trial lens sets which allow the anomalous refraction to be tested.

1.2 It also covers the general and functional requirements of the trial lens sets for prescription of spectacles.

2. TERMINOLOGY

2.0 For the purpose of this standard, the definitions given in Indian Standard 'Glossary of terms relating to ophthalmic lenses and spectacle frames (*under preparation*)' and IS:1399-1959†, and the following shall apply.

2.1 Lens Holder — Plastic or metallic holding device to hold the lens firmly in its grip and position.

*Rules for rounding off numerical values (*revised*).

†Glossary of terms used in optical technology.

3. GENERAL REQUIREMENTS

3.1 The materials used for optical and mechanical parts shall be free from flaws and defects and the former shall conform to the requirements of IS: 988-1959* and IS: 4382-1967†.

3.2 Each lens of the trial set shall be properly mounted in a lens holder.

3.3 The lens shall be made of extra white quality crown ophthalmic glass and shall conform to IS: 5695-1970‡ except the tolerances.

3.4 The metallic lens holders shall either be chrome plated or anodized with a mat finish and the power of the lens shall be indicated on the lens holder clearly with a plus or minus sign as the case may be. Permanent marks indicating the cylinder axis or the prism base-apex line shall be positioned on the lens along the diameter of the circular mount.

3.5 The lens holder shall be suitably grooved inside to accommodate the edge of the lens in such a way that the lens is rigidly fitted and secured without appreciable strain.

3.6 The outer diameter of the lens holder shall be 38.00 ± 1.00 mm.

3.7 The lens cases shall be made of well seasoned wood or any other suitable material in such a way that they are of sufficiently sturdy construction to provide adequate protection during transportation and handling.

3.8 Each case shall be provided with a carrying handle, suitable for easy carriage and also with proper locking arrangement.

4. FUNCTIONAL REQUIREMENTS

4.1 The standard trial sets shall generally be made in three different sizes, that is, large, medium and small.

4.2 The different sizes of trial set cases shall contain the following pairs of lenses and accessories:

Sl No.	Description of the Lenses to be Included in the Case	Quantity of Pieces for Different Size Cases		
		Large	Medium	Small
i)	Non-astigmatic plus lenses	36 pairs with refraction from 0.12 to 20.0 dioptries, both inclusive	32 pairs with refraction from 0.12 to 20.00 dioptries, both inclusive	24 pairs with refraction from 0.12 to 16.0 diop- tres, both inclusive

*General requirements for optical components.

†Specification for non-tinted ophthalmic glass.

‡Specification for spectacle lenses.

Sl No.	Description of the Lenses to be Included in the Case	Quantity of Pieces for Different Size Cases		
		Large	Medium	Small
ii)	Non-astigmatic minus lenses	36 pairs with refraction from 0.12 to 20.0 dioptries, both inclusive	32 pairs with refraction from 0.12 to 20.0 dioptries, both inclusive	24 pairs with refraction 0.12 to 16.0 dioptries, both inclusive
iii)	Astigmatic plus lenses	24 pairs from 0.12 to 8.00 dioptries (cylindrical), both inclusive	20 pairs with 0.12 to 6.00 dioptries (cylindrical), both inclusive	12 pairs from 0.25 to 4.0 dioptries (cylindrical), both inclusive
iv)	Astigmatic minus lenses	24 pairs from 0.12 to 8.00 dioptries (cylindrical), both inclusive	20 pairs from 0.12 to 6.00 dioptries (cylindrical), both inclusive	12 pairs from 0.25 to 4.0 dioptries, both inclusive
v)	Spectacle prismatic lenses	6 pairs with prismatic action, that is, 0.5, 1.0, 2.0, 3.0, 4.0 and 5.0 prism dioptries and 5 pieces with prism action, 6.0, 7.0, 8.0, 9.0 and 10.0 prism dioptries	4 pairs with prismatic action 0.5, 1.0, 2.0 and 3.0 prism dioptries and 7 pieces with prism action, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0 and 10.0 prism dioptries	7 pieces with prism action 0.5, 1.0, 2.0, 3.0, 4.0, 6.0 and 8.0 prism dioptries
vi)	Red and green glass light filters	One pair of red colour and one pair of green colour	One piece of red colour and one piece of green colour	One piece of red colour and one piece of green colour
vii)	Plane parallel glass plates (of colourless glass)	Two pieces	One piece	One piece

Sl No.	Description of the Lenses to be Included in the Case	Quantity of Pieces for Different Size Cases		
		Large	Medium	Small
viii)	Maddox cylinders (red glass)	One piece	One piece	One piece
ix)	Ground surface glass	One piece	One piece	—
x)	Metal circular diaphragms (plates)	4 pairs consisting of one pair without a hole, one pair with 1.5 mm dia hole, one with 3.0 mm dia hole and one pair with a slit of 1.5 mm width	4 pieces consisting of one without hole, one with a hole of 1.5 mm dia, one with a hole of 3.0 mm dia and one with a slit of 1.5 mm width	3 pieces consisting of one without hole, one with a hole of 1.5 mm dia and one with a slit of 1.5 mm width
xi)	Cross-cylinders (crossing astigmatic lenses)	One piece with refraction in the main sections of -0.25 dioptré and $+0.25$ dioptré, one piece with refraction in the main sections -0.5 dioptré and $+0.5$ dioptré	—	—
xii)	Universal test frame and PD measuring gauge	One piece each	One piece each	One piece each

4.3 The details of dioptric powers of lenses in each case both for non-astigmatic and astigmatic numbers, shall be as under.

4.3.1 Non-astigmatic in Large Case (36 Pairs) — $\pm 0.12, 0.25, 0.5, 0.75, 1.0, 1.25, 1.50, 1.75, 2.0, 2.25, 2.5, 2.75, 3.0, 3.25, 3.5, 3.75, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0$ and $20.0D$.

4.3.2 For Astigmatic Lenses in Large Case (24 Pairs) — $\pm 0.12, 0.25, 0.50, 0.75, 1.00, 1.25, 1.50, 1.75, 2.0, 2.25, 2.50, 2.75, 3.0, 3.25, 3.50, 4.0, 4.50, 5.0, 5.50, 6.0, 6.50, 7.0, 7.50$ and $8.0D$.

4.3.3 Non-astigmatic Lenses in Medium Size (32 Pairs) — Same as in large except No. $6.5, 7.5, 15.0$ and $17.0D$.

4.3.4 Astigmatic Lenses in Medium Size (20 Pairs) — Same as in large except No. $6.5, 7.0, 7.5$ and $8.0D$.

4.3.5 Non-astigmatic Lenses in Small Case (24 Pairs) — $\pm 0.12, 0.25, 0.50, 0.75, 1.0, 1.25, 1.50, 1.75, 2.0, 2.25, 2.50, 2.75, 3.0, 3.50, 4.0, 4.5, 5.0, 6.0, 7.0, 8.0, 10.0, 12.0, 14.0$ and $16.0D$.

4.3.6 Astigmatic in Small Size (12 Pairs) — $\pm 0.25, 0.50, 0.75, 1.0, 1.25, 1.50, 1.75, 2.0, 2.5, 3.0, 3.5$ and $4.0D$.

4.4 Tolerances

4.4.1 Optical Properties — The tolerance or the maximum permissible error of trial case lenses shall be as follows:

a) Spheres and cylinders

1) Lens power

Marked Power	Tolerance
Plano to 1.00 dioptres	± 0.03 dioptres
Over 1.00 to 6.00 dioptres	± 0.06 dioptres
Over 6.00 to 13.00 dioptres	± 0.09 dioptres
Over 13.00 dioptres	± 0.12 dioptres

2) Optical centration (with respect to the centre of a circular mount)

Marked Power	Maximum Error
0.12 dioptres	5 mm
0.25 to 0.50 dioptres	2 mm
Over 0.50 to 2.00 dioptres	1 mm
Over 2.00 dioptres	0.5 mm

b) Cylinders

1) Axis marking

Marked Power	Maximum Error
0.12 dioptres	5°
0.25 dioptres	3°
0.37 to 0.62 dioptres	2°
0.75 to 1.25 dioptres	$1\frac{1}{2}^\circ$
Over 1.25 dioptres	1°

2) Prism in axis meridian — Any prismatic effect in the axis meridian of a cylinder shall not exceed 0.15 prism dioptres.

c) *Plano prisms*1) *Power**Marked Power**Tolerance*

Up to 6 prism dioptries

 ± 0.12 prism dioptries

Over 6 prism dioptries

 ± 0.25 prism dioptries

A nominal plano lens shall conform to the above tolerance.

2) *Base-apex line marking* — Errors in marking the base-apex line give rise to a deviation at right angles to this line, the transverse error.

*Marked Power**Maximum Transverse Error*

Up to 3 prism dioptries

0.06 prism dioptries

Over 3 to 6 prism dioptries

0.12 prism dioptries

Over 6 prism dioptries

0.25 prism dioptries

4.4.2 Cross Line (Centring) Disks — The intersection of the cross lines on cross line (centring) disks shall be within 0.5 mm of the true geometrical centre of the mount.

4.4.3 Maddox Rods or Grooves — Prismatic deviation in a direction at right angles to the projected streak shall not exceed 0.2 prism dioptries.

4.4.4 Pinhole Disks and Stenopaedic Slits — The ranges of pinhole disks and stenopaedic slits shall each include one with an aperture of 1 mm.

5. ACCESSORIES

5.1 Light arrangement may also be provided inside the trial cases for better visibility during testing.

6. MARKING

6.1 The size, manufacturer's name and trade-mark shall be marked on the case at a suitable place.

6.1.1 The trial sets may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

7. PACKING

7.1 The trial sets shall be properly packed as specified in IS : 5415-1969*.

*Code of practice for packing and packaging of optical and mathematical instruments and components.

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